## REMARKS

Claim Amendments:

Claims 1-28 are currently being amended to present them in proper format. Support for the amendments is found throughout the specification and in the originally filed claims. For example, support for amended claim 1 is found in page 12, lines 3-4. Support for amended claim 6 is found in page 10, lines 5-6 of the specification. Support for amended claim 10 is found in page 11 lines 6-7. Support for amended claim 11 is found in page 8, line 20-21 of the specification. No new matter has been added. After amending the claims as set forth above, claims 1-28 are now pending in this application.

A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

***Claim Rejection - 35 U.S.C. section 112***

Claim 11 is rejected under 35 U.S.C. section 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states:

> Claim 11 contains the trademark/trade name MELIORAN®. Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Office Action at page 2.*

Applicants have amended claim 11 to delete the reference to MELIORAN®. Reconsideration and withdrawal of the rejection is respectfully requested.

***Claim Rejections - 35 U.S.C. section 103(a)***

<u>1. Rejection of Claims Over Nonninger in View of Mukherjee and Bitterlich</u>

Claims 1-7, 9-10, 13, 19-23, 25 and 27 are rejected under 35 U.S.C. section 103(a) as being unpatentable, for a variety of reasons, over the references:

> Nonninger *et al.* (. . . US 2004/0115416 A1; hereafter Nonninger), in view of Mukherjee *et al.* ("Correlation Between Slurry Rheology, Green Density, and Sintered Density of Tape Cast Yttria Stabilized Zirconia" Ceramics International 27 (2001) 731-739; hereafter Mukherjee) and Bitterlich *et al.* ("Rheological Characterization of Water-Based Slurries for the Tape Casting Process" Ceramics International 28 (2002) 675-683). See, Office Action at page 3.

Applicants respectfully traverse.

<u>1.A. The Cited References do Not Disclose Each Element of the Claimed Invention Alone or in Combination</u>

The MPEP states regarding claim rejections based on 35 U.S.C. section 103(a):

> [t]o reject a claim based on this rationale . . . [o]ffice personnel *must* articulate the following:
> (1) a finding that the prior art included *each element* claimed, although not necessarily in a single prior art reference, with the only difference between the claimed invention and the prior art

> being the lack of actual combination of the elements in a single prior art reference . . . . Emphasis added. See, MPEP 2143.A.

Independent claim 1 states, ". . . adding a *solution* of at least one polymer in a solvent to said suspension A, by means of which a suspension B is obtained." Emphasis added. The Examiner acknowledges that "Nonninger does not explicitly teach . . . the polymer added to suspension A is in *solution* with a solvent . . . ." Emphasis added. See Office Action at page 4, paragraph 8. Mukerjee states nothing about dissolving the polymers, PVB, PEG, and BBP into a solution before adding them to the metal oxide powder. See, for example Mukherjee at page 732, section 2.1, last paragraph and section 2.2. Thus, neither Nonninger nor Mukherjee discloses adding a polymer solution to suspension A to form suspension B.

The Examiner alleges that:

> Bitterlich teaches a method of making stable ceramic suspensions (specifically for t-YSZ, pg 676) for coating processes (see, for example, abstract, pg 675-676), which further involve a two step mixing process wherein the powder / solvent / dispersant are first prepared and mixed, and then *solution of a polymer (binder) / solvent are added to the first mixture* (see, for example, pg 676-677). Emphasis added. See Office Action at page 4, paragraph 8.

However, Bitterlich states, "Tape casting slurries were prepared from 8 mol% yttria stabilized zirconia . . . distilled water and a water based polymeric *emulsion* (Mowilith DM765 S . . .)." Emphasis added. See Bitterlich at page 676, section 2.1. Therefore, Bitterlich teaches that a polymeric *emulsion*, and not a polymeric solution, was added to the dispersed metal oxide powder to prepare the tape casting slurry.

Further, according to the attached Exhibit A, Mowilith DM765 S is an aqueous *dispersion* of the polymers based on methacrylic acid esters and styrene. Such lipophilic polymers are unlikely to dissolve in water in any appreciable amount. Therefore, as claimed by Applicants, Bitterlich does not disclose "adding a *solution* of at least one polymer in a solvent" to a suspension of metal oxides in a liquid. Moreover, the Examiner has not demonstrated that an emulsion or a dispersion of a polymer is equivalent to a polymer solution.

Since the cited references do not, as required by MPEP, include *each element* of the claim 1, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1

under 35 U.S.C. section 103(a). Since claims 2-7, 9-10, 13, 19-23, 25 and 27 depend on claim 1, Withdrawal of the rejections of these claims under 35 U.S.C. section 103(a) is also respectfully requested.

1.B. The Cited References Teach Away from the Claimed Invention

Regarding combination of references to allege prima facie obviousness of a claimed invention, the MPEP states, "[i]t is improper to combine references where the references teach away from their combination. See, e.g., MPEP section 2145.X.D.2 quoting *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). In a section entitled "The Nature of the Teaching Is Highly Relevant" the MPEP further states, "[a] prior art reference that "teaches away" from the claimed invention is a significant factor to be considered in determining obviousness." *Id.* at 2145.X.D.1.

Applicants' claimed invention is related to a method of preparing metal oxide layers on a substrate. It arises in part out of the surprising discovery that a dip coating method, known to be useful for depositing sols or solutions, is useful for depositing suspensions or dispersions to produce metal oxide layers on substrates. According to the claimed invention, there is no need to mill the metal oxide powders for preparing the metal oxide layers on the substrates. See Applicants' Application at page 14 lines 11-14.

As claimed, a *suspension* or *dispersion* of particulates could be, surprisingly, deposited on a surface by *dip coating*, i.e., by immersion of the substrate in the suspension and withdrawal of the substrate. Accordingly, the need for using plasticizers or binders in the process was minimized. A solution of a polymer added to the suspension during the process, among other steps, ensured, upon dip coating, formation of an appropriate green film on the substrate, which, upon calcination, yielded layers much thicker than those obtained by customary dip coating methods. *Id.* at Examples 1 and 2. Therefore, the claimed invention was, surprisingly, able to incorporate the advantages of the dip coating and the tape casting methods, and was surprisingly useful for forming metal oxide layers from a suspension using dip coating method.

The customary dip coating method of making layer on a substrate is useful for depositing sols or solutions on a substrate. On the other hand, the method, known as the tape casting method, of making layers on substrates, is useful for depositing suspensions on a substrate. However, a number of plasticizers and binders need to be added to the suspension to ensure flexibility and cohesion of the suspension or the tape-casting "slip." *Id.* at page 19-21. The method of depositing the suspension according to this method, on the substrate requires deposition by means of a "blade" which levels the paste on the substrate to form a green film.

The cited references teach either dip coating methods using sols or solutions, or tape casting methods and teach away from the claimed invention for the following reason. Nonninger only exemplifies methods of depositing *solutions* that are deposited by immersion coating method. See Nonninger, Example 1, and Example 3 at paragraph 31. Nonninger does not disclose depositing a *suspension* by immersion coating.

Nonninger states, "[t]he inventive ceramic composition contains . . . at least one oxycarboxylic acid . . . ." See, Nonninger at paragraph 15. Examples 1 and 3 both disclose methods that include oxycarboxylic acids. Applicants' claimed invention makes no reference to oxycarboxylic acids.

Mukherjee discloses only tape casting methods. See for example, the Abstract and page 732, section 2.5. Mukherjee makes no reference to using a suspension for a modified *dip coating* as in the claimed invention.

For preparing the suspension for tape casting, Mukherjee teaches that:

> The powder was first *milled* in a solvent containing a dispersant using $ZrO_2$ as milling media *for 12 h. This step breaks down agglomerates which may be present in the powder.* In the second step, the required amounts of binder and plasticizers were added to the suspension and *milled for another 24 h* before final casting or rheological measurements. Emphasis added. See Mukherjee at page 732, section 2.2.

Mukherjee teaches that the suspension should be *milled thoroughly, for hours*, to break down agglomerates. No such milling is performed in the claimed invention where the any agglomerates

are broken down and dispersed by adding a dispersant and a polymer solution to a dispersion of the metal oxide.

Bitterlich discloses a tape casting method. See, the Abstract, page 676, section 2.1 and 2.3. In contrast, the claimed invention is related to a modified *dip coating* method where a metal oxide *suspension* or *dispersion* can be coated on a substrate.

Bitterlich discloses prolonged ball milling, *for 66 hours*, for dispersing the powder of the metal oxide in the suspension. No such milling is performed in the claimed invention.

Moreover, as discussed above in section 1A, in preparing the slip, Bitterlich teaches that a polymer *dispersion* be added to the metal oxide slurry. Since the claimed invention is related to adding a polymer solution to a metal oxide suspension (suspension A), Bitterlich teaches away from the claimed invention.

For the reasons stated above, Nonninger, Mukherjee, and Bitterlich each teaches away from the claimed invention. Therefore, one or more of these references are improperly combined to reject claim 1 under 35 U.S.C. section 103(a). Reconsideration and withdrawal of the rejection is respectfully requested. Since claims 2-7, 9-10, 13, 19-23, 25 and 27 depend on claim 1, withdrawal and reconsideration of the rejections of these claims under 35 U.S.C. section 103(a) is also respectfully requested.

<u>1.C. There was no Teaching Suggestion or Motivation in the Cited References or in the Knowledge Generally Available to One of Ordinary Skill in the Art to Modify the Cited Reference or to Combine Their Teachings and Arrive at the Claimed Invention</u>

Related to rejecting a claim under 35 U.S.C. section 103(a) by combining teachings of prior art reference to arrive at the claimed invention, MPEP states:

> [t]o reject a claim based on this rationale . . . [o]ffice personnel must articulate the following:
> (1) a finding that there was some teaching, suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings . . . . See MPEP 2143.G.

The present invention arises, in part, out of the surprising discovery that adding a polymer solution to a dispersion of powdered metal oxide provides a suspension or slip (a slip being customarily used for tape casting) that is deposited on a substrate by *dip coating* as opposed to tape casting. Combining features belonging to two fundamentally different methods, customary dip coating and customary type casting methods, in order to arrive at the method according to the invention is in itself extremely surprising. Such knowledge was *not generally* available to one of ordinary skill in the art, to modify or combine Bitterlich, Mukherjee, and/or Nonninger, to arrive at the claimed invention.

Mukherjee and Bitterlich each discloses tape casting methods without any mention of any underlying difficulties in the method. In fact, Bitterlich begins with disclosing the virtues of the tape casting method stating, "[t]he tape casting process is an economical method to produce thin, flat ceramic components such as substrates capacitors, piezoactuators, sensors, etc." Based on Bitterlich and Mukherjee, since they do not disclose any need to alter the tape casting process, there is no motivation to modify or combine Bitterlich, Mukherjee, and/or Nonninger, and arrive at the claimed invention. Similarly, Nonninger mentions no drawbacks of the immersion or dip coating method to provide a motivation to modify or combine Bitterlich, Mukherjee, and/or Nonninger, and arrive at the claimed invention.

None of Nonninger, Mukherjee, and Bitterlich even discloses an element of the claimed invention – addition of the polymer solution to Suspension A to obtain the suspension B that is coated on the substrate according to the claimed invention.

As there was no teaching, suggestion, or motivation, either in the references Nonninger, Mukherjee, and Bitterlich, themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, Nonninger, Mukherjee, and Bitterlich are improperly combined to reject claim 1 under 35 U.S.C. section 103(a). Reconsideration and withdrawal of the rejection is respectfully requested. Since claims 2-7, 9-10, 13, 19-23, 25 and 27 depend on claim 1, withdrawal and reconsideration of the rejections of these claims under 35 U.S.C. section 103(a) is also respectfully requested.

1.D. There was no Reasonable Expectation of Success to Combine the Cited References and Arrive at the Claimed Invention

The MPEP states that to combine a reference and reject a claim under 35 U.S.C. section 103(a), a reasonable expectation of success is required. See, e.g., MPEP, 2143.G, 2143.02. The MPEP further states that to combine the disclosure of a reference for rejection under 35 U.S.C. section 103 (a), at least some degree of predictability is required. *Id.* at 2143.02.II. Predictability is determined at the time the invention was made. *Id.* at 2143.02.III.

The claimed invention arises, in part, out of the surprising discovery that a suspension of metal oxide powders is useful for dip coating. Suspensions or slurries are customarily used for tape casting. Combining features belonging to two fundamentally different methods in order to arrive at the method according to the invention is in itself extremely surprising.

Moreover, Bitterlich states in conclusion:

> The data showed that it is not sufficient to look at the composition of the slurry to choose the most suitable slurry for tape casting. Due to the different effects of water, binder and powder content and their complex interactions no simple correlation can be made between composition and tape casting behavior. See Bitterlich at page 683.

Given the variety of components in a dip coating or tape casting slurry, such as the dipersants, the dispersing solvents, the binders, the plasticizers, and/or other polymers, and the variety of methods of mixing them, such as ball milling, one pot mixing of components, and/or step wise mixing of components, based on Bitterlich as quoted above, there would have been no reasonable expectation of success to combine the references and arrive at the suspension B or the methods of the claimed invention, when the claimed invention was made.

For the reasons stated above, Nonninger, Mukherjee, and Bitterlich are improperly combined to reject claim 1 under 35 U.S.C. section 103(a). Reconsideration and withdrawal of the rejection is respectfully requested. Since claims 2-7, 9-10, 13, 19-23, 25 and 27 depend on claim 1, reconsideration and withdrawal of the rejections of these claims under 35 U.S.C. section 103(a) is also respectfully requested.

2. Rejection of Claims Over Nonninger in View of Mukherjee Bitterlich and Valente

Claim 14 is rejected under 35 U.S.C. section 103(a) as being unpatentable over Nonninger in view of Mukherjee and Bitterlich as applied to claim 1 above, and further in view of Valente *et al.* (US patent 5,244,691, hereafter Valente).

In rejecting the claims, the Examiner states:

> Nonninger in view of Mukherjee and Bitterlich teach the method of claim 1, but none explicitly teaches wherein the polymer is a polymer obtainable from the reaction between hexamethylenetratramine and acetylacetone in acid medium. Valente teaches a method of depositing thin ceramic films (see, for example, abstract). Valente further teaches that it is well known in the art to use a polymer formed from a reaction between a hexamethyelenetetramine and acetylacetone in an acid medium as a binding additive which aids in determining the viscosity and rheology of the coating composition (see, for example, abstract, and col 3 lines 1-41). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated a polymer obtainable from the reaction between hexamethylenetratramine and acetylacetone in acid medium as the polymer in the method of Nonninger in view of Mukherjee and Bitterlich as such a polymer is well known in the art, and can predictably help to control the viscosity of the coating composition. See Office Action at page 8.

Applicants respectfully traverse.

Applicants have established in Section 1 above that claim 1 is not unpatentable under 35 U.S.C. section 103(a) in view of Nonninger, Mukherjee, and Bitterlich. Since claim 14 depends on claim 1, claim 14 is also not obvious in view of Nonninger, Mukherjee, and Bitterlich, and further in view of Valente.

Moreover, Valente states:

> The present invention provides a process for depositing a thin layer based on the use of a *homogenous solution* whose rheology can be adapted to the *"wafer-spinning" deposit* of multi-component systems. Emphasis added. See, Valente at column 3, lines 4-8.

Valente exemplifies the process stating, "[t]he substance obtained may be used as is for *a wafer-spinning deposit (deposit conditions: 20 seconds, 2,000 rotations per minute)* on substrates such as corundum and silicon preliminarily coated with platinum . . . ." Emphasis added. *Id.* at lines

52-54. While Valente discloses *wafer-spinning deposits* of *homogenous solutions*, claim 14 is directed to a *dip coating* method, which the Applicants surprisingly found to work with *suspensions* of metal oxides. Therefore, Valente teaches away from claim 14.

Also Valente provides no motivation for one of skill in the art to combine Valente for the purpose of arriving at the claimed invention.

Therefore, Valente is not useful as a reference to be combined in rejecting claim 14 under 35 U.S.C. section 103(a).

For the reasons stated above, claim 14 is not unpatentable under 35 U.S.C. section 103(a) over Nonninger in view of Mukherjee and Bitterlich as applied to claim 1 above, and further in view of Valente. Reconsideration and withdrawal of the rejection is respectfully requested.

3. Rejection of Claims Over Nonninger in View of Mukherjee Bitterlich and Haruta

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nonninger in view of Mukherjee and Bitterlich as applied to claim 1 above, and further in view of Haruta *et al.* (US 2003/0152704; hereafter Haruta).

In rejecting the claim, the Examiner states:

> Nonninger in view of Mukherjee and Bitterlich teach the method of claim 1, but none explicitly teach wherein the solution of at least one polymer further more contains the same metals as those of the oxide powder. Haruta teaches a method of applying an oxide coating via dipcoating to a substrate surface (see, for example, abstract, [0092]). Haruta further teaches wherein the coating composition comprises a ceramic oxide (such as titanium oxide particles, see, for example, [0074], [0086]) and the addition of a halide of the same metal (such as titanium halide, which provides Ti metal, see, for example, [0080]). Haruta teaches that such an addition of metal species is well known in the art to improve coating properties such as density (see, for example [0249]-[0251]). . . . Nonninger in view of Mukherjee, Bitterlich, and Haruta do not explicitly teach wherein the same metals are added specifically at the polymer solution step, but it would have been obvious to one of ordinary skill in the art at the time of invention to have added the metal species to the polymer solution since the "selection of any order of mixing ingredients is *prima facie* obvious" In re Gibson, 39 F2d 975, 5 USPQ 230 (CCPA 1930) MPEP 2144.04 IV. C. See Office Action at pages 8-9.

Applicants respectfully traverse.

Applicants have established in Section 1 above that claim 1 is not unpatentable under 35 U.S.C. section 103(a) in view of Nonninger, Mukherjee, and Bitterlich. Since claim 15 depends on claim 1, claim 15 is also not obvious in view of Nonninger, Mukherjee, and Bitterlich, and further in view of Haruta.

While Haruta cursorily mentions dip coating, no further details of using dip coating, particularly for a *suspension* of metal oxides, is disclosed. Instead, the Examples in Haruta, demonstrate preparing layers by *spray coating*. See, e.g., paragraphs 142, 143, 161, 162, 163, 200, and 202. The claimed invention, in contrast, employs, *dip coating*, surprisingly enough, with a suspension of metal oxides.

Therefore, Haruta teaches away from the claimed invention. Also, Haruta provides no motivation for one of skill in the art to combine Haruta for the purpose of arriving at the claimed invention. For the reasons stated above, claim 15 is not unpatentable under 35 U.S.C. section 103(a) over Nonninger in view of Mukherjee and Bitterlich as applied to claim 1 above, and further in view of Haruta. Reconsideration and withdrawal of the rejection is respectfully requested.

<u>4. Rejection of Claims Over Nonninger in View of Mukherjee Bitterlich and Lee</u>

Claims 8, 12, and 16-18 are rejected under 35 U.S.C. section 103(a) as being unpatentable over Nonninger in view of Mukherjee and Bitterlich as applied to claim 1 above, and further in view of Lee ("Dip Coating of Alumina Films by the Sol-gel Method" J. Mater. Res. Vol. 8, No.12, Dec 1993, 3151-3157; hereafter Lee).

In rejecting the claims, the Examiner states:

> Nonninger in view of Mukherjee and Bitterlich teach the method of claim 1, wherein Nonninger teaches the coating is applied by dipcoating ([0009]), but none explicitly teach wherein the metal oxide powder content in the initial oxide suspension of 1 to 80%, the mass content of dispersant in the initial oxide suspension of from 0.1 to 10% by weight relative to the mass of dry metal oxide powder added, the viscosity of the polymer solution is 5 mPa.s to 1000 mPa.s, to combine the polymer solution and the initial oxide

> suspension in a mass ratio of 0.01 to 3, nor wherein the step of removing the substrate from the final suspension is at a controlled rate of 0.1 to 100 cm/min. Lee teaches a method of forming an oxide layer onto a substrate via a dipcoating method (see, for example, abstract). Lee further teaches that it is well known in the dipcoating art that factors including oxide concentration, solution viscosity, and the rate of withdrawal will influence the final coating properties such as thickness and uniformity (see, for example, pg 3154-3155). Further, one of ordinary skill in the art would appreciate that the amount of dispersant and viscosity of the polymer solution would influence the final suspension viscosity, and wherein the mass content of each suspension and solution and their mass ratio to each other would influence the final suspension's oxide concentration. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated a metal oxide powder content in the initial ceramic suspension of 1 to 80%, a mass content of dispersant in the initial ceramic suspension of from 0.1 to 10% by weight relative to the mass of dry metal oxide powder added, a polymer solution viscosity of 5 mPa.s to 1000 mPa.s, to combine the polymer solution and the initial oxide suspension in a mass ratio of 0.01 to 3, and to incorporate a controlled substrate removal rate of 0.1 to 100 cm / min since these factors are known as result effective variables, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). See Office Action at pages 10-11.

Applicants respectfully traverse.

Applicants have established in Section 1, above, that claim 1 is not unpatentable under 35 U.S.C. section 103(a) in view of Nonninger, Mukherjee, and Bitterlich. Since claims 8, 12, and 16-18 depend on claim 1, claim 14 is also not obvious in view of Nonninger, Mukherjee, and Bitterlich, and further in view of Lee.

Moreover, Lee discloses "dip coating from an aluminum alkoxide *solution*." See the Abstract of Lee. Lee does *not* disclose dip coating from a *suspension*. The claims, 8, 12, and 16 - 18 are directed to the surprising method of dip coating from a suspension including dispersed metal oxide particles. Dip coating, using a sol or a solution, is problematic for porous substrates

because during immersion or deposition, the sol infiltrates into the pores of the substrate via capillary effect. Moreover, dip coating becomes problematic with increasing viscosity of the depositing sols.

Therefore Lee teaches away from the claimed invention by teaching how to coat an aluminum alkoxide *solution* on stainless steel and glass.

Moreover, Lee states:

> In our experiments, when the solution viscosity was above 10 cP, a good quality film could not be obtained. See Lee at page 3154. The surface morphology of the coating film shows poorer quality with increasing viscosity of the coating solution. When the viscosity increases as a result of progress in hydrolysis and polycondensation, the generation of defects can be attributed to the formation of a network structure in the solution. The separation of the film may be caused by the adhesive force being lower than the cohesive force within the solidified film. *Id.*

In the surprising method of the claimed invention, the dip coating works for suspensions including metal oxide dispersions and having much higher viscosity than customary sols used for dip coating. For example, Applicants' Application states, "[t]he viscosity of the solution may vary from 5 mPa.s to 1000 mPa.s, preferably from 20 mPa.s to 100 mPa.s." (A centipoise or cP, and millipascal second or mPa.s are the same units.) See specification at page 9, lines 7-8. The specification also states, "[t]he viscosity of the polymer solution . . . is generally from 1 to 1000 mPa.s, preferably 20 to 100 mPa.s." See *Id.* at page 13, lines 13-15.

Therefore, the claimed invention operates at viscosities of the dispersed metal oxide powders that are typically higher than that disclosed in Lee. Moreover, Lee discourages any attempt to even use *sols* of viscosity higher than 10 cP (or 10 mPa.s). In these ways, Lee teaches away from the claimed invention.

For the reasons stated above, claim claims 8, 12, and 16-18 are not unpatentable under 35 U.S.C. section 103(a) over Nonninger in view of Mukherjee and Bitterlich as applied to claim 1 above, and further in view of Lee. Reconsideration and withdrawal of the rejection is respectfully requested.

5. Rejection of Claims Over Nonninger in View of Mukherjee Bitterlich and Seabaugh

Claims 24, 26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nonninger in view of Mukherjee and Bitterlich as applied to claim 1 above, and further in view of Seabaugh *et al.* (US 2003/0003237; hereafter Seabaugh).

In rejecting the claims, the Examiner states:

> Nonninger in view of Mukherjee and Bitterlich teach the method of claim 1 and 27, wherein Nonninger further teaches the substrate as metal, glass, enamel or ceramic (see, for example [0023]). Nonninger further teaches wherein the coatings can serve in a variety of catalytic, electrolyte, and solar cell applications ([0002]), and that the coating composition is preferably a yttrium stabilized zirconium ([0013]). Seabaugh teaches a method of applying a YSZ coating via a wet chemistry method for a variety of electrochemical system applications (see, for example, abstract, [0002]). See, Office Action at page 11.

Applicants respectfully traverse.

Applicants have established in Section 1, above, that claim 1 is not obvious under 35 U.S.C. section 103(a) in view of Nonninger, Mukherjee, and Bitterlich. Since claims 24, 26, and 28 depend on claim 1, claim 14 is also not obvious in view of Nonninger, Mukherjee, and Bitterlich, and further in view of Seabaugh.

Moreover, Seabaugh teaches away from the claimed invention by disclosing and teaching *spray coating* methods for depositing ceramic electrolyte material onto ceramic substrate. See, Seabaugh at paragraph 21, 23, 26, 29, 30, 31, 38, 51. Even the examples describe only a *spray coating* method and *spray coating* slurry. See, Examples 2 and 4.

In contrast, the claimed invention is directed towards a *dip coating* method that surprisingly is capable of effectively depositing *dispersions or suspension*s of powdered metal oxides onto a substrate. Thus, Seabaugh teaches away from the claimed invention.

For the reasons stated above, claims 24, 26, and 28 are not unpatentable under 35 U.S.C. section 103(a) over Nonninger in view of Mukherjee and Bitterlich as applied to claim 1 above, and further in view of Seabaugh. Reconsideration and withdrawal of the rejection is respectfully requested.

6. Conclusion

To reject a claim under 35 U.S.C. section 103(a):

> "[t]he examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." See, e.g., MPEP at section 2142. The ultimate determination of patentability is based on the entire record, by *a preponderance of evidence*, with due consideration to the persuasiveness of any arguments. *Id.* With regard to rejections under 35 U.S.C. section 103, the examiner must provide evidence which as a whole shows that the legal determination sought to be proved (i.e., the reference teachings establish a *prima facie* case of obviousness) *is more probable than not*. Emphasis added. *Id.* Facts established by rebuttal evidence must be evaluated along with the facts on which the conclusion of obviousness was reached, *not against the conclusion itself.* Emphasis added. *Id.* quoting *In re Eli Lilly & Co.*, 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990).

Applicants respectfully submit that based on the discussion above and the evidence presented by the Applicants, a *prima facie* case of obviousness can not be established by a preponderance of evidence to reject the instant claims under 35 U.S.C. section 103(a). Therefore, reconsideration and withdrawal of the rejections under 35 U.S.C. section 103(a) is respectfully requested.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. sections 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37

C.F.R. section 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date May 26, 2009

By ____________________

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# Exhibit A

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**Product description**

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